

Milwaukee County COVID-19 Data Summary

Milwaukee County COVID-19 Epidemiology Intel Team

This report was updated on August 20, 2020 and includes data through August 18, 2020. Note that data for recent weeks may be under-reported due to pending test results.

Milwaukee County COVID-19 Summary Statistics

Overall Milwaukee County COVID-19 Summary Statistics March 1 - August 18

Total tests performed	318,735
Percent positive of all tests performed	8.3%
Number of confirmed cases	22,435
Number of hospitalizations	2,010
Number of deaths	430
Case fatality rate	1.9%

Weekly Milwaukee County COVID-19 Summary Statistics August 12 - August 18

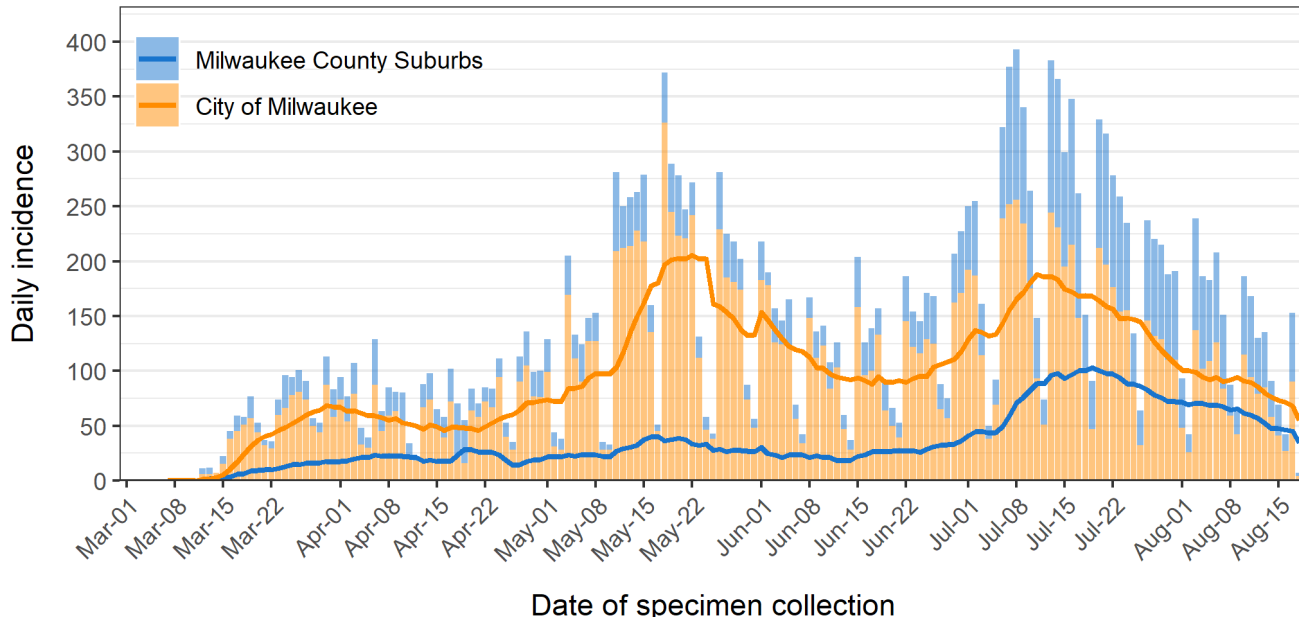
Total tests performed	19,902
Percent positive of all tests performed	5.0%
Number of confirmed cases	627
Number of hospitalizations	66
Number of deaths	2

Total Cases and New Cases

There are now a total of 22435 cases in Milwaukee County, since the first confirmed case on March 6th, 2020. Over the last week, we observed 627 new confirmed cases in Milwaukee County, including 384 new cases in the city of Milwaukee. **Figure 1** shows the daily incidence of new cases (bars) and the average daily incidence within the last 7 days (line), which provides a smoothing effect to enhance visualization, for both the city and the county.

Over the last week, we have seen a decrease in confirmed cases. The highest daily case count since the beginning of the epidemic occurred on July 8, 2020, with 393 cases in the county overall and 256 cases in the city. Of note, the highest daily case count over the entire period in the suburbs occurred recently, on July 13, 2020, with a total of 139 cases confirmed, while the highest case count in the city occurred earlier, on May 18, 2020, with a total of 326 cases confirmed. Two free testing sites opened to the public within the City of Milwaukee on May 11th, which may have resulted in the identification of a large number of new cases around this time.

Figure 1: Milwaukee Co. daily number of COVID-19 cases

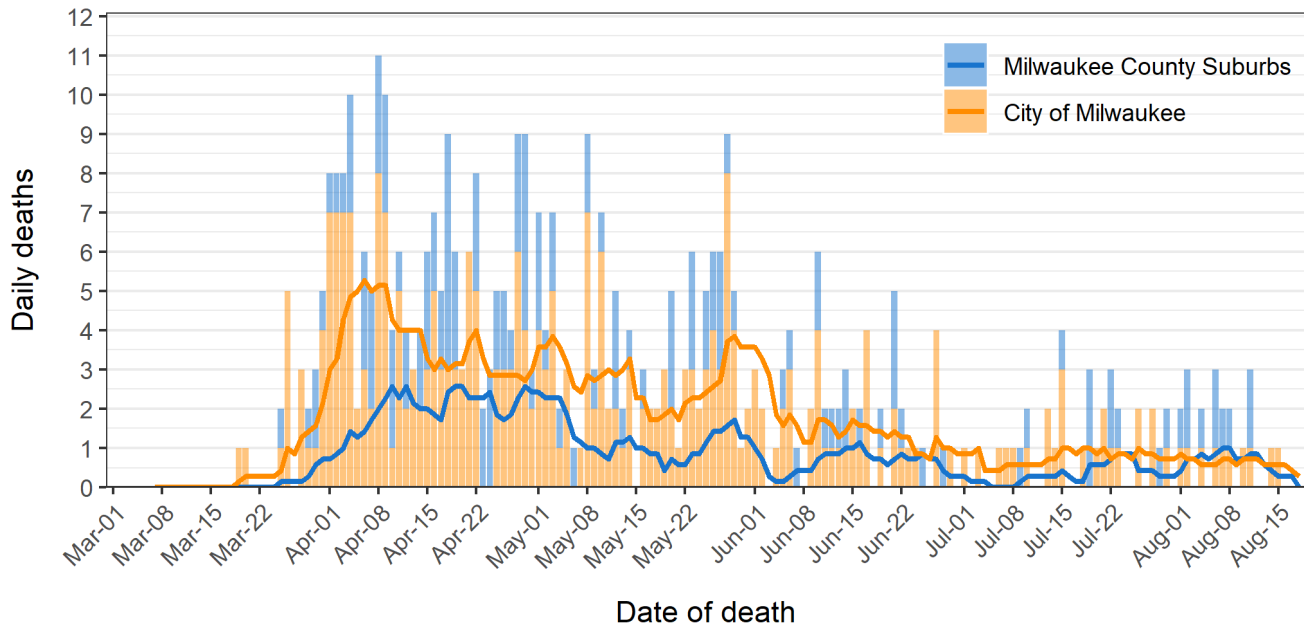


Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

Total Deaths and New Deaths

There are a total of 430 COVID-19 related deaths in Milwaukee County. Over the last week, we observed 2 deaths, 2 of which are from the City of Milwaukee. **Figure 2** shows the number of daily COVID-19 related deaths among Milwaukee County and City of Milwaukee residents. The overlaid lines show the average daily deaths within the last 7 days for each jurisdiction. Overall, there appears to be a decrease in the daily number of deaths observed, from a peak of 11 deaths on April 8, 2020. Several smaller peaks in deaths are notable since April 8th, with an overall decrease to a low number of deaths beginning in early June.

Figure 2: Milwaukee Co. COVID-19 daily deaths

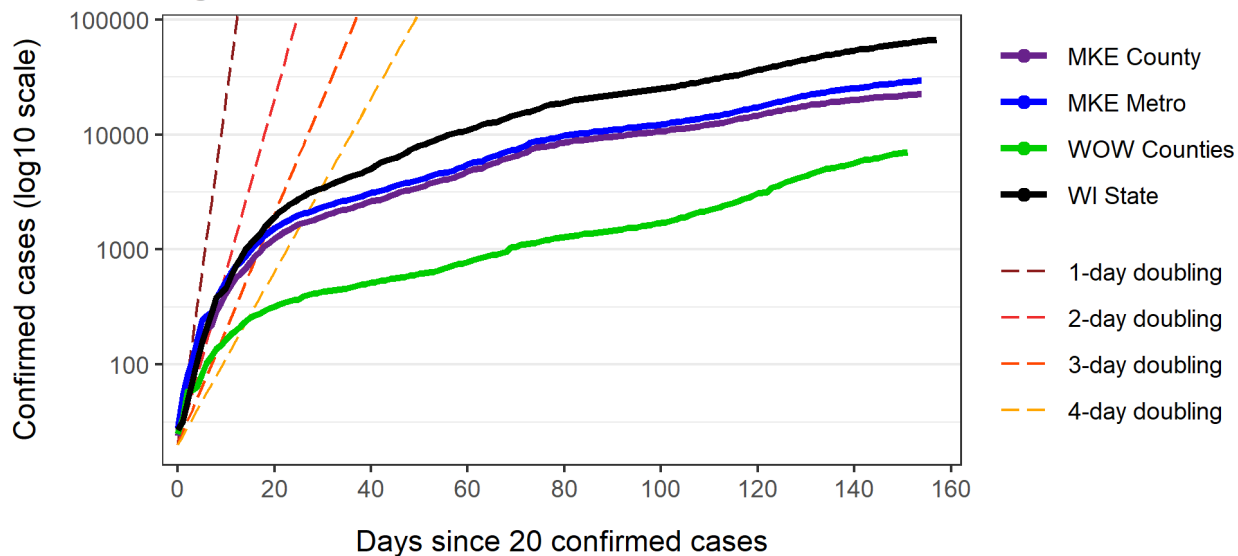


Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

The COVID-19 Growth Rate

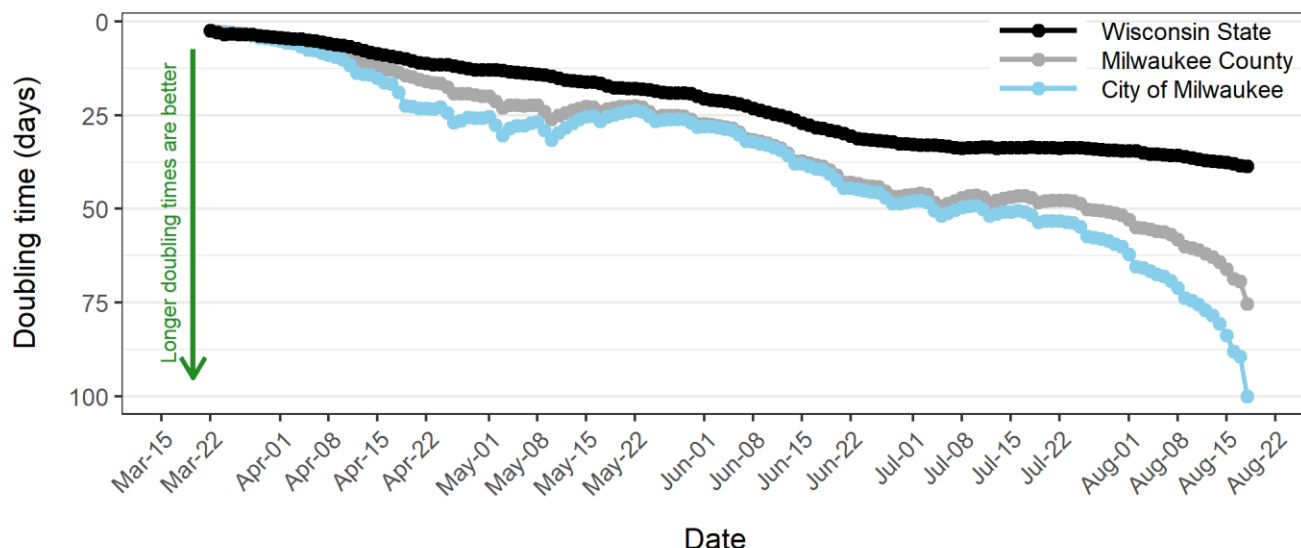
The time it takes for the number of cases to double is called the doubling time. **Figure 3** shows doubling times for Milwaukee County, the surrounding Waukesha, Ozaukee and Walworth (WOW) counties, the M7 (7-county) metropolitan area, and the state of Wisconsin. Dotted lines indicate doubling times of 1, 2, 3 and 4 days, which are generally associated with a condition of exponential growth. The current doubling time in Milwaukee County is 75.39 days. The current doubling time for WOW counties is 42.05 days. The current doubling time for the state of Wisconsin is 38.67 days. **Figure 4** shows the trend in doubling times for Milwaukee County and the City of Milwaukee as compared to the state, over the course of the epidemic. As illustrated, the epidemic initially doubled more quickly in Milwaukee County and the city, but has since slowed (improved) more in the city and county than in the state as a whole.

Figure 3: Cumulative cases after 20 confirmed



Data source: Wisconsin Department of Health Services
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Figure 4: Trend in doubling times



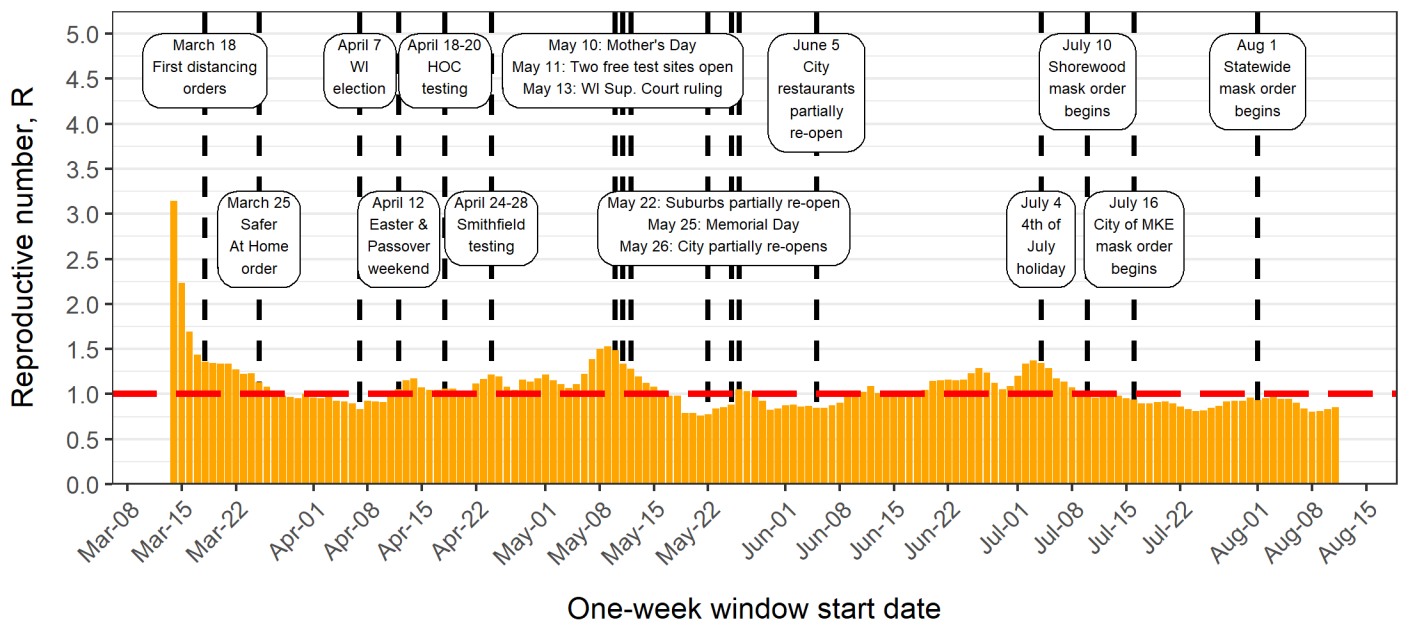
Data sources: WI Department of Health Services & WI Electronic Disease Surveillance System
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

The COVID-19 Reproductive Number

Another way of examining the growth rate of the infection is to examine the reproductive number (R). This number captures the number of new cases that are the result of an existing case. For example, an R of 2 would indicate that each infected person infects 2 new people. The following plots show the change in R over time for Milwaukee County, **Figure 5**, the City of Milwaukee, **Figure 6a**, and Milwaukee County suburbs, **Figure 6b**. Each plot includes key dates related to physical distancing or focused testing campaigns affecting residents. The R for each date is calculated to represent the R for a 7-day period with the start day of that 7-day period represented on the graph.

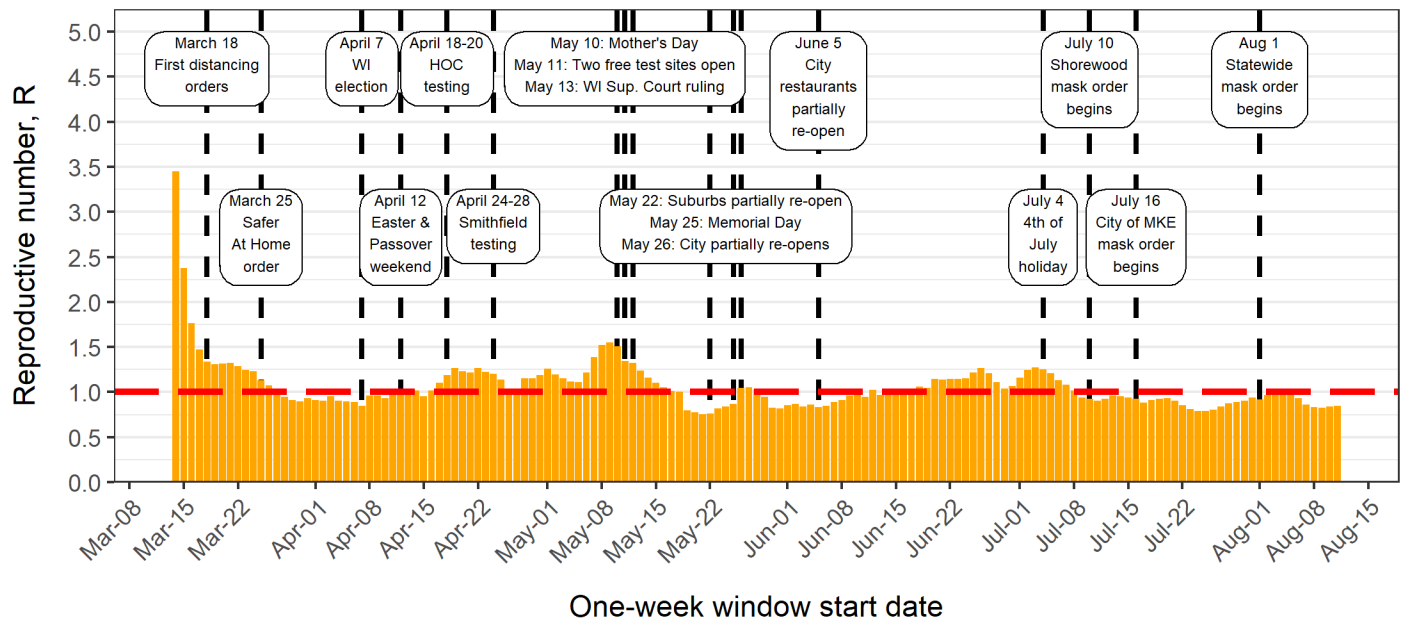
After the first minimum R value in Milwaukee County observed ($R = 0.83$ on April 7, 2020), we observed an increase in R to a high of 1.53 on May 9, 2020 and then a decrease to a low of 0.76 in the county on May 21, 2020. The R increased again to a recent high of 1.38 on July 3, 2020, and has since decreased. Patterns in the City of Milwaukee are very similar to those in the county overall. Patterns in the suburbs show more fluctuation. The R values for the most recent week are 0.852 for the county, 0.847 in the city, and 0.864 in the suburbs.

Figure 5: One week reproductive number for Milwaukee County



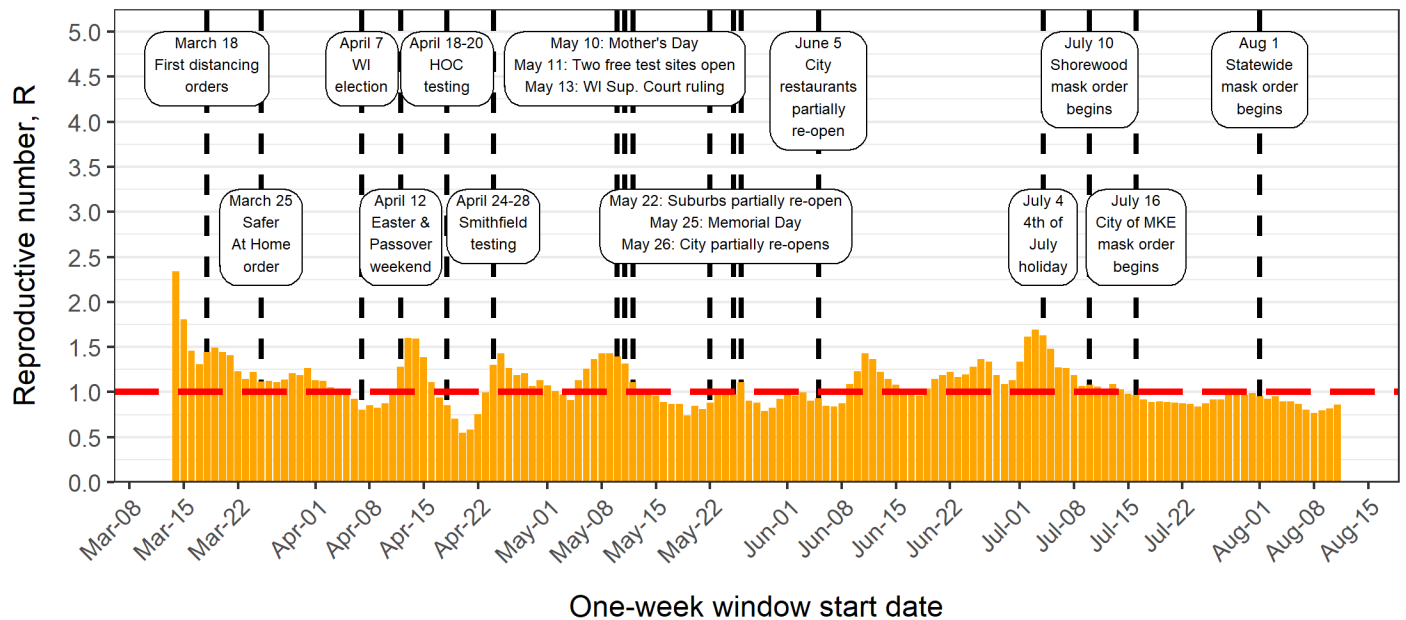
Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

Figure 6a: One week reproductive number for City of Milwaukee



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

Figure 6b: One week reproductive number for Milwaukee County suburbs



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

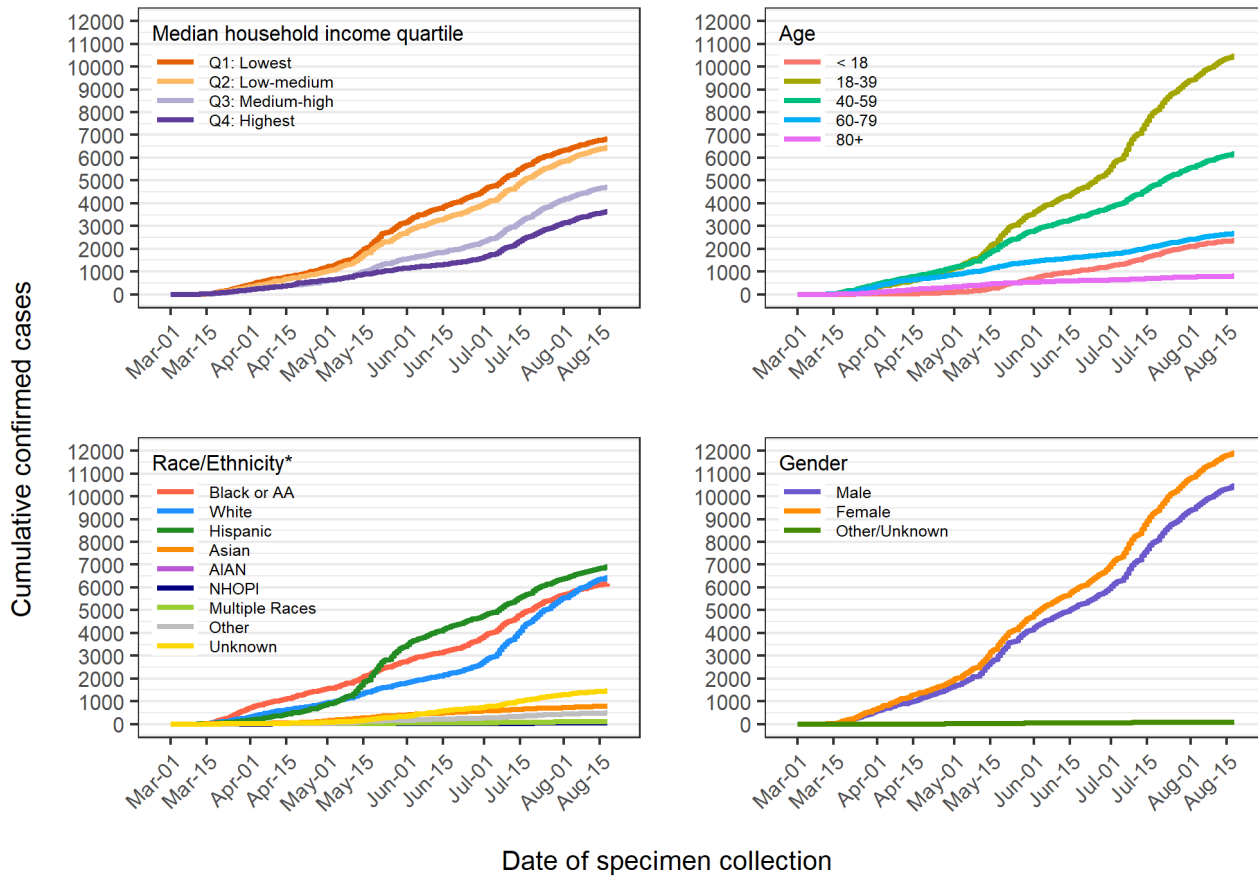
Demographic Patterns – Age, Sex, Race and Ethnicity

Confirmed cases

COVID-19 cases vary by demographic characteristics. **Figure 7** shows cumulative case plots including confirmed positive cases with an available specimen collection date, plotted by census block group (CBG) median household income, sex, age, and race/ethnicity groups. Most diagnosed cases fall within the ages of 18-79. Of all confirmed cases, 47% are male and 53% are female. The largest number of cases have been diagnosed among the Hispanic population (N = 6896), followed by the Black/AA population (N = 6154). The lower two quartiles of median household income (\$0 - \$35,833, and \$35,834 to \$50,096) have a larger number of cases than the higher two quartiles (\$50,097 to \$68,393, and \$68,394 to \$250,001), with the fewest cases identified among the highest income group.

Over the past week, we have further observed increases among individuals in all income groups, those ages 18-39, and among non-Hispanic Whites and to a lesser degree Hispanics and Blacks, with similar increases for both sexes. The cumulative number of cases among those ages 18-39 (N = 10452) now far exceeds the number among the next highest group, those ages 40-59 (N = 6160). In the last few weeks, we saw the number of cases under age 18 (N = 2363) increase to approach the number diagnosed among those 60-79 (N = 2667). This week, we saw the number of cases among non-Hispanic Whites (N = 6432) exceed the number among Blacks (N = 6154).

Figure 7: Cumulative confirmed cases in Milwaukee County



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)

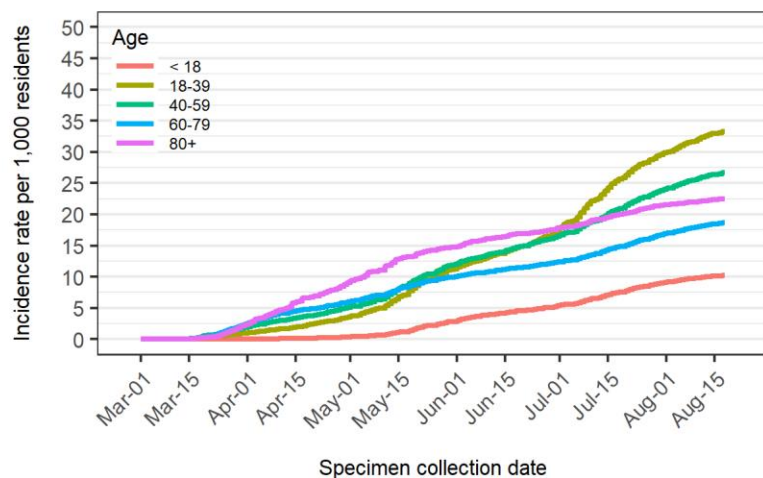
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

*Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.

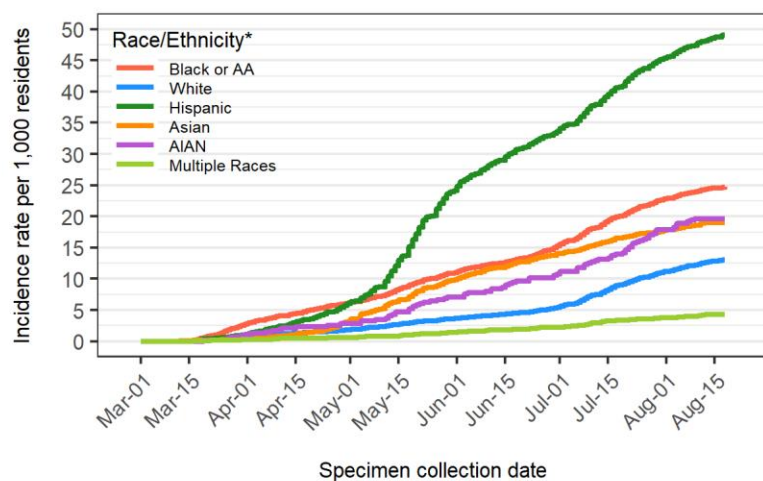
AIAN stands for American Indian or Alaska Native and NHOPI stands for Native Hawaiian or Other Pacific Islander.

When examined as population-based rates in **Figure 8**, demographic patterns are also apparent. Early in the epidemic, we saw a clear age gradient in population-based rates, with older populations experiencing greater rates. However, in the last months, we have seen rates among two younger, working age groups (18-39, 40-59) exceed the rate of those ages 80+. By race and ethnicity, the rate was highest among Black/AA populations until the beginning of May, when we observed a surge among Hispanics resulting in the Hispanic rate (49.06 per 1,000 people) exceeding that among all other racial and ethnic groups. We observe a recent increase in the rate among Black/AA populations to exceed the rate among Asians, and an uptick among non-Hispanic Native American Indians (AIAN). The population-based rate among non-Hispanic Whites is relatively low compared to other racial and ethnic groups. Rates are very similar among males and females.

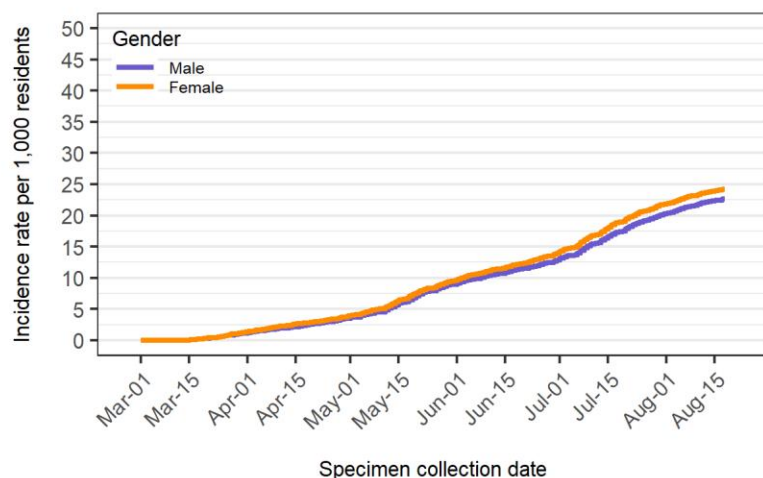
Figure 8: Population based incidence rates in Milwaukee County



Age	N Cases	Population	Rate per 1,000 residents
< 18	2363	231111	10.22
18-39	10452	314141	33.27
40-59	6160	230887	26.68
60-79	2667	142783	18.68
80+	793	35287	22.47



Race/Ethnicity*	N Cases	Population	Rate per 1,000 residents
Black or AA	6154	249011	24.71
White	6432	493723	13.03
Hispanic	6896	140575	49.06
Asian	770	40443	19.04
AIAN	91	4647	19.58
Multiple Races	104	24224	4.29



Gender	N Cases	Population	Rate per 1,000 residents
Male	10460	461670	22.66
Female	11906	492539	24.17

Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)

Created by the Milwaukee County COVID-19 Epidemiology Intel Team

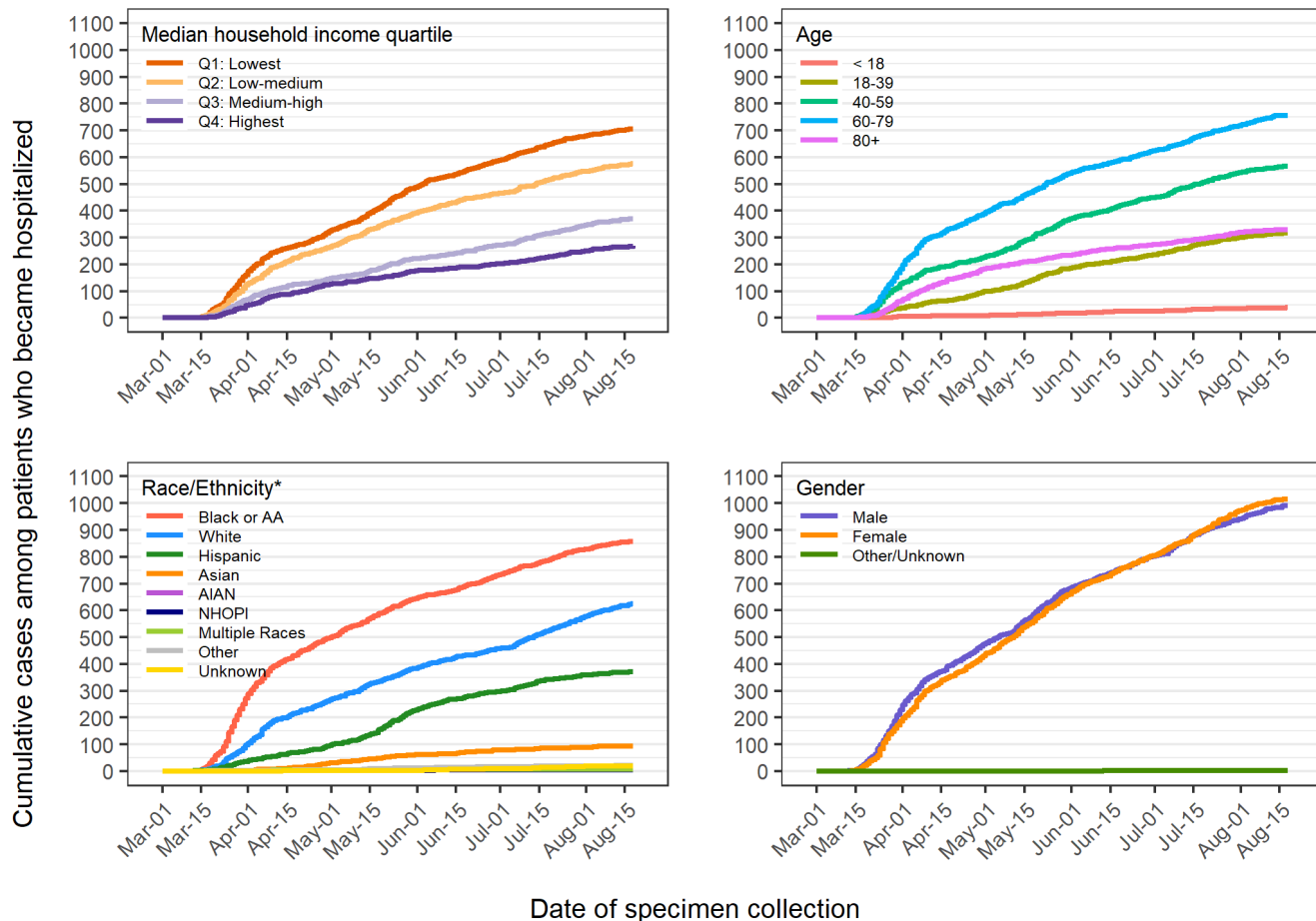
*Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.

AIAN stands for American Indian or Alaska Native and NHOPI stands for Native Hawaiian or Other Pacific Islander.

Hospitalizations

A total of 2010 individuals have been hospitalized due to COVID-19 in the county. **Figure 9** shows cumulative hospitalizations based on lab specimen collection date (as admission dates are incomplete). The highest number of hospitalizations continues to be among those ages 60-79 (N = 756). The highest number of hospitalizations have occurred among the Black/AA community (N = 857), followed by the Non-Hispanic White community (N = 624) and then the Hispanic community (N = 371). Overall, counts are lower among other racial and ethnic groups. Females now slightly outnumber males, comprising 50.5% of all hospitalized cases. More individuals among lower income than higher income groups have been hospitalized, with a clear income gradient observed. Hospitalizations among those 18-39 (N = 318) are gradually approaching the number among those 80+ (N = 330).

Figure 9: Cumulative hospitalizations in Milwaukee County



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)

Created by the Milwaukee County COVID-19 Epidemiology Intel Team

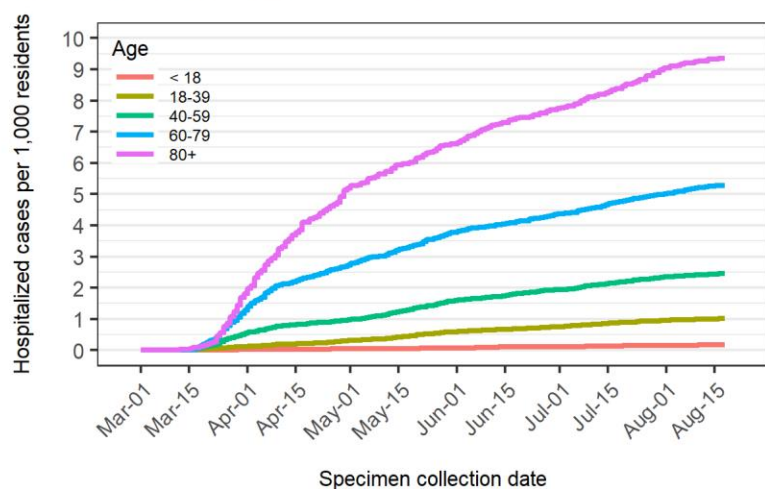
*Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.

AIAN stands for American Indian or Alaska Native and NHOPI stands for Native Hawaiian or Other Pacific Islander.

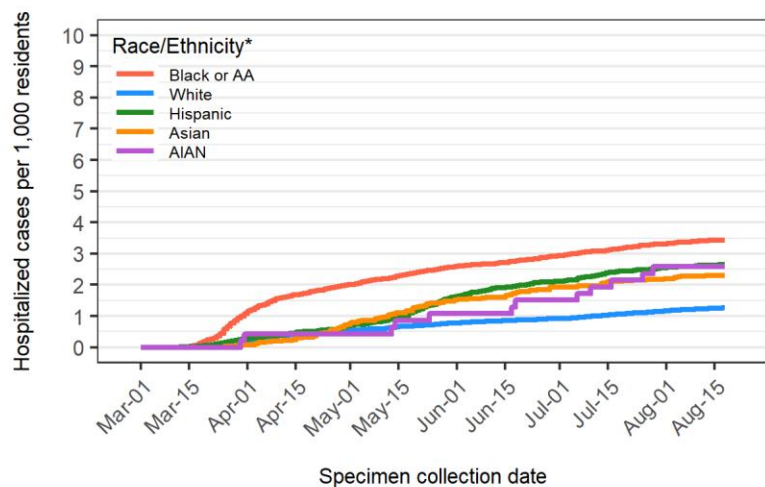
When examined as population-based rates and case-based rates in **Figure 10**, hospitalization patterns are also apparent by demographic characteristics. Both population- and case-based hospitalization rates exhibit a clear age group gradient, with older age groups experiencing higher rates. By race and ethnicity, population and case-based hospitalization rates are highest among the Black/AA population and the population-based rate is lowest for non-Hispanic Whites. Rates by gender are very similar, with higher hospitalization rates among males. All rates presented are crude rates and only groups with 10 or more

total hospitalized cases are shown. Of note, the AIAN group now exceeds 10 hospitalized cases and is included in the race/ethnicity plot.

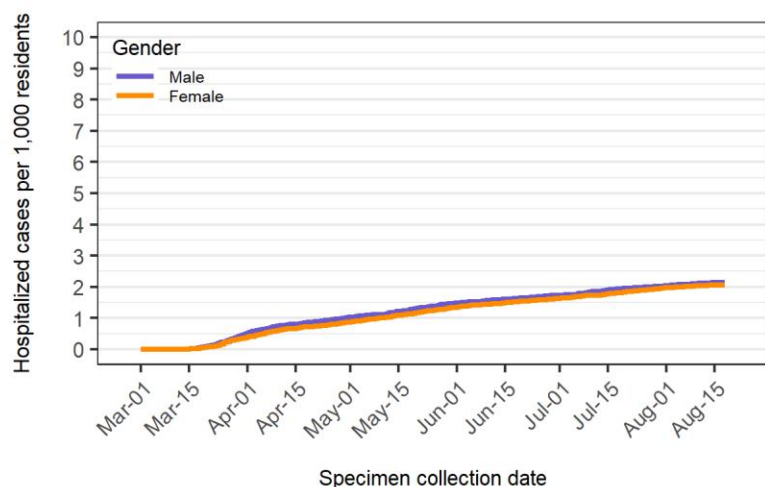
Figure 10: Population and case based hospitalization rates in Milwaukee County



Age	N Hospitalized Cases	Rate per 1,000 residents	Rate per 100 cases
< 18	39	0.17	1.65
18-39	318	1.01	3.04
40-59	567	2.46	9.20
60-79	756	5.29	28.35
80+	330	9.35	41.61



Race/Ethnicity*	N Hospitalized Cases	Rate per 1,000 residents	Rate per 100 cases
Black or AA	857	3.44	13.93
White	624	1.26	9.70
Hispanic	371	2.64	5.38
Asian	93	2.30	12.08
AIAN	12	2.58	13.19



Gender	N Hospitalized Cases	Rate per 1,000 residents	Rate per 100 cases
Male	992	2.15	9.48
Female	1016	2.06	8.53

Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)

Created by the Milwaukee County COVID-19 Epidemiology Intel Team

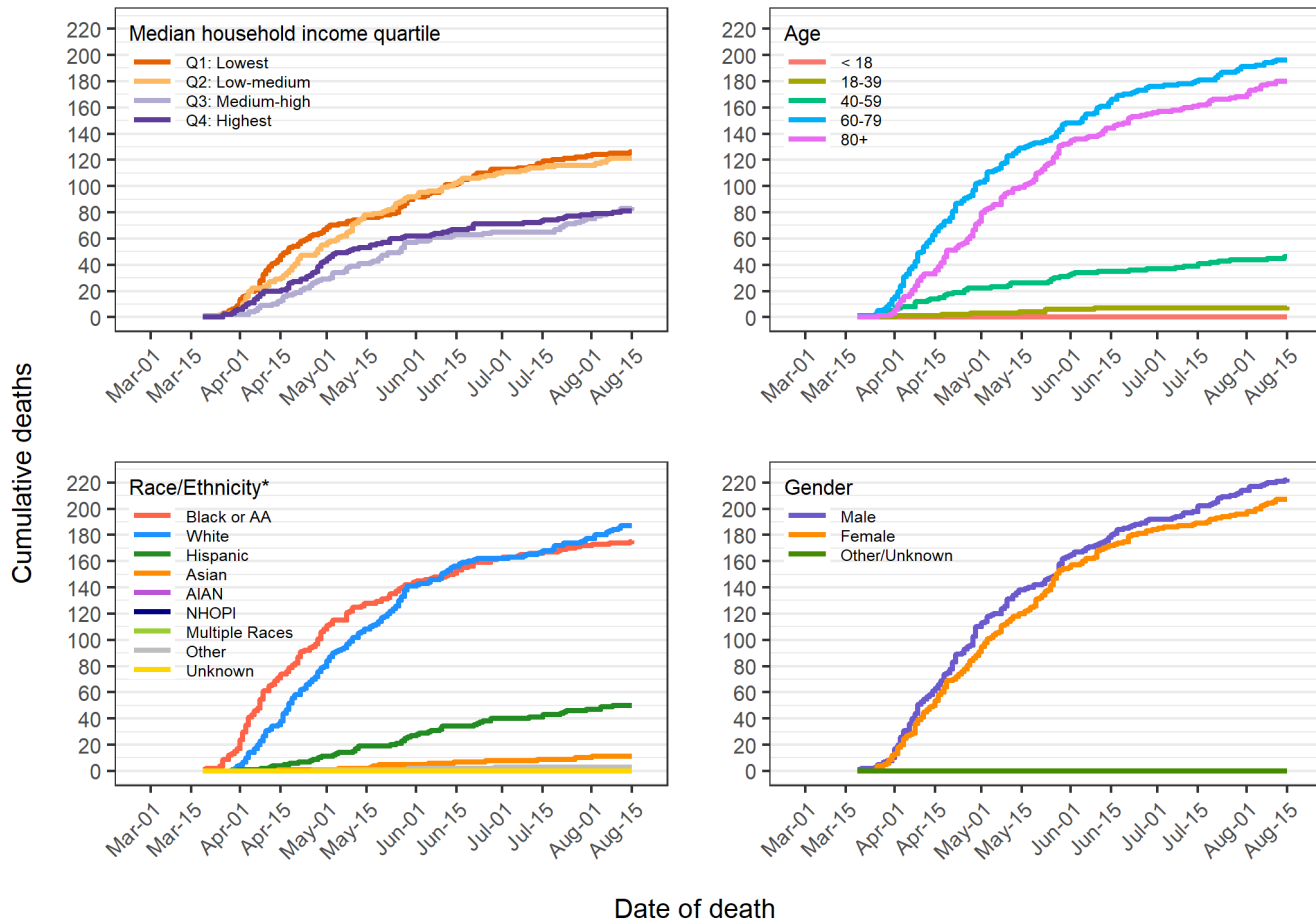
*Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.

AIAN stands for American Indian or Alaska Native and NHOPI stands for Native Hawaiian or Other Pacific Islander.

Deaths

There are now a total of 430 confirmed deaths in Milwaukee County, representing a case fatality rate of 1.9%. We observed 2 new deaths over the past week in the county. Mortality patterns differ by demographic characteristics, as shown in **Figure 11**. The largest number of deaths are recorded among those age 60 or older. The largest number of deaths are recorded for males (N = 223) and for non-Hispanic Whites (N = 187) followed closely by the Black/AA community (N = 176). By income, there are a larger number of deaths among the two lower income groups as compared to the two higher income groups. Deaths among Hispanics remain relatively low.

Figure 11: Cumulative deaths in Milwaukee County



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)

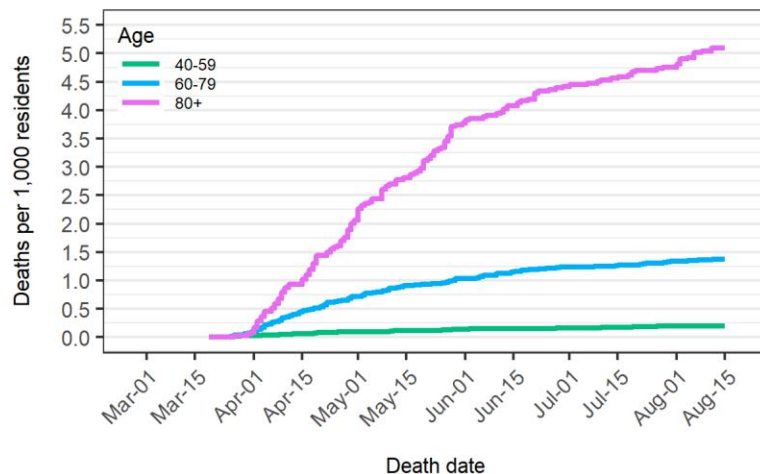
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

*Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.

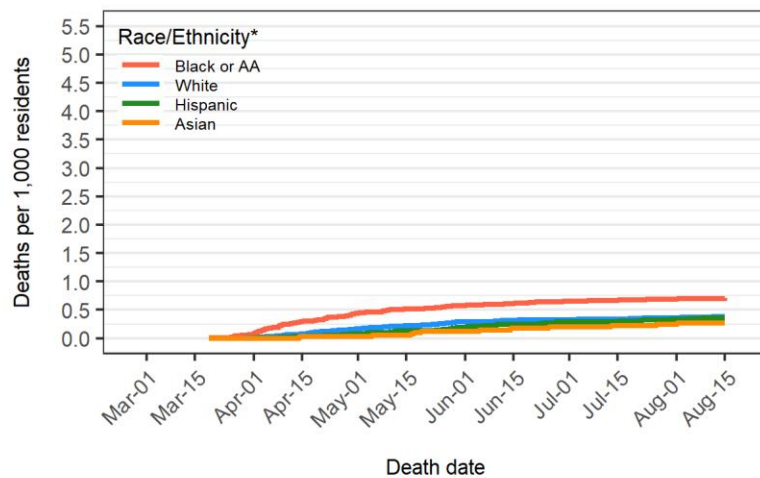
AIAN stands for American Indian or Alaska Native and NHOPI stands for Native Hawaiian or Other Pacific Islander.

In terms of population- and case-based rates shown in **Figure 12**, there is a clear age category gradient, with higher death rates among older populations. Gender-based rates are very similar. Black/AA populations have the highest population-based death rates, and non-Hispanic Whites have the highest case-based death rates. All rates presented are crude rates and only groups with 10 or more total deaths are shown.

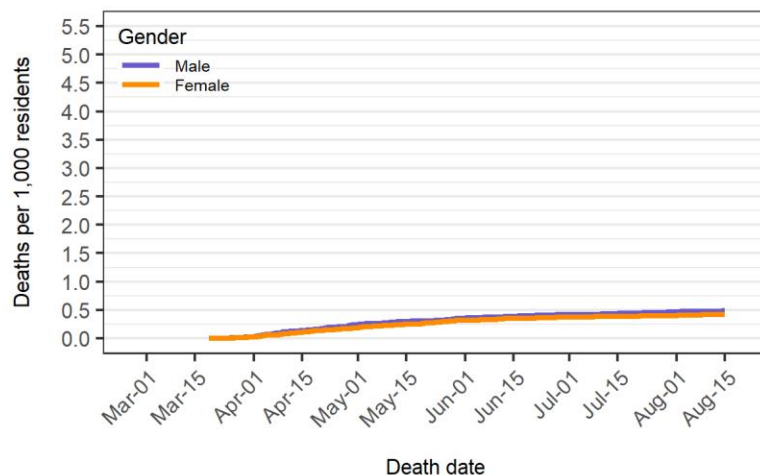
Figure 12: Population and case based death rates in Milwaukee County



Age	N Deaths	Rate per 1,000 residents	Rate per 100 cases
40-59	46	0.20	0.75
60-79	196	1.37	7.35
80+	180	5.10	22.70



Race/Ethnicity*	N Deaths	Rate per 1,000 residents	Rate per 100 cases
Black or AA	176	0.71	2.86
White	187	0.38	2.91
Hispanic	50	0.36	0.73
Asian	11	0.27	1.43



Gender	N Deaths	Rate per 1,000 residents	Rate per 100 cases
Male	223	0.48	2.13
Female	207	0.42	1.74

Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)

Created by the Milwaukee County COVID-19 Epidemiology Intel Team

*Race and ethnicity were combined into one variable where the Hispanic category includes Hispanics of any race.

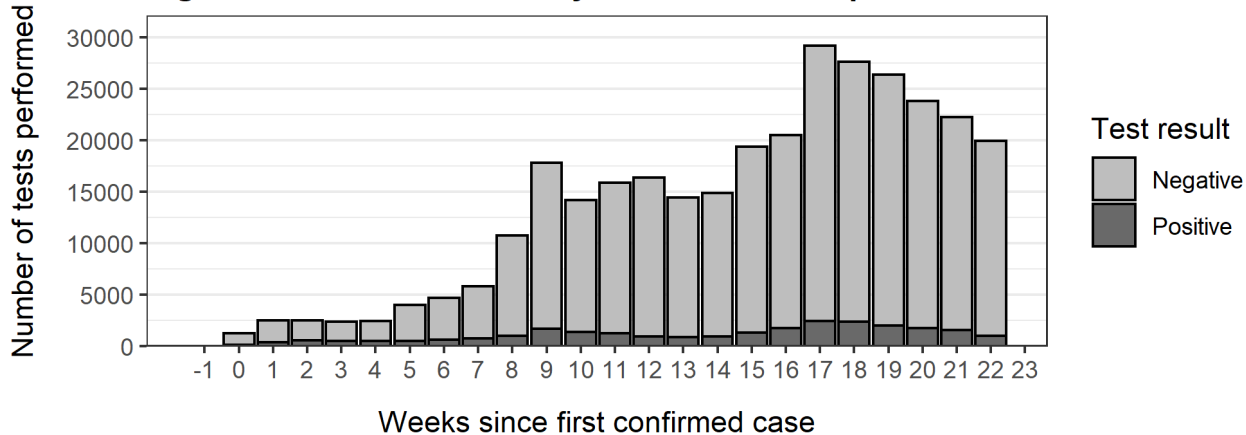
AIAN stands for American Indian or Alaska Native and NHOPI stands for Native Hawaiian or Other Pacific Islander.

Testing Coverage

Testing for the novel coronavirus is an important public health response to limiting the spread of the infection. Testing capacity was limited in Milwaukee County and across the country earlier in the epidemic, but then increased. Since the first case of COVID-19 was diagnosed in Milwaukee County on March 6, 2020, a total of 318735 COVID-19 tests have been performed, with 292423 negative results and 26312 positive results. This represents a positive test rate of 8.3% since the beginning of the epidemic.

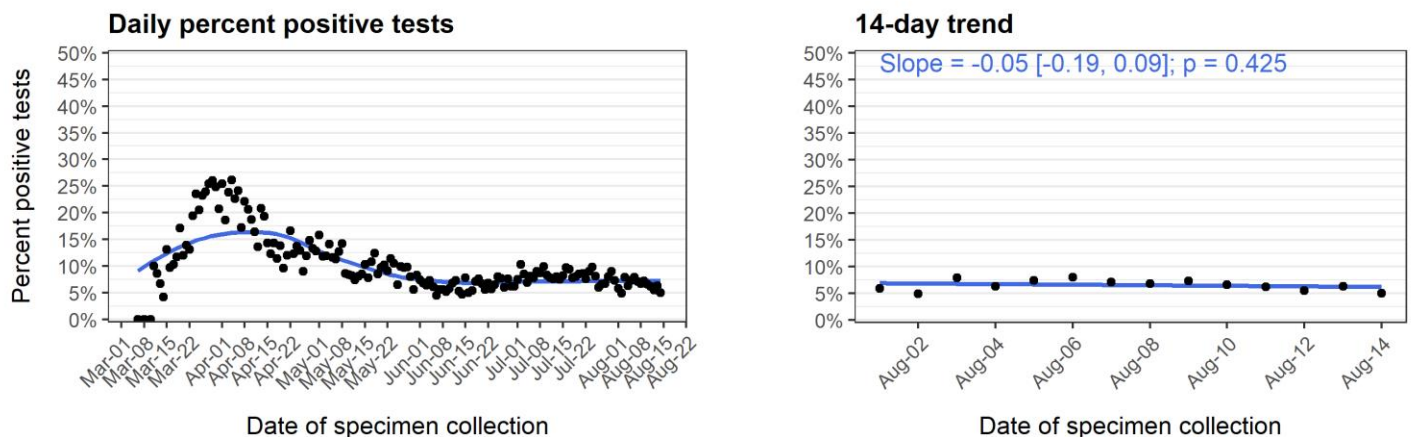
As shown in **Figure 13**, the total number of tests performed per week increased for several weeks and has now appeared to peak and decline. As shown in **Figure 14**, the percentage of positive tests has varied over the course of the epidemic, with a high of 25-30% in early April. Since then, the percent positive has changed in tandem with expanded testing capacity. The percentage of positive tests was 5.0% over the past week compared to 7.0% the previous week. **Figure 14** also illustrates the 14-day trend in the percent positive tests, showing no significant change.

Figure 13: Milwaukee County number of tests per week



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

Figure 14: Milwaukee County percent positive tests

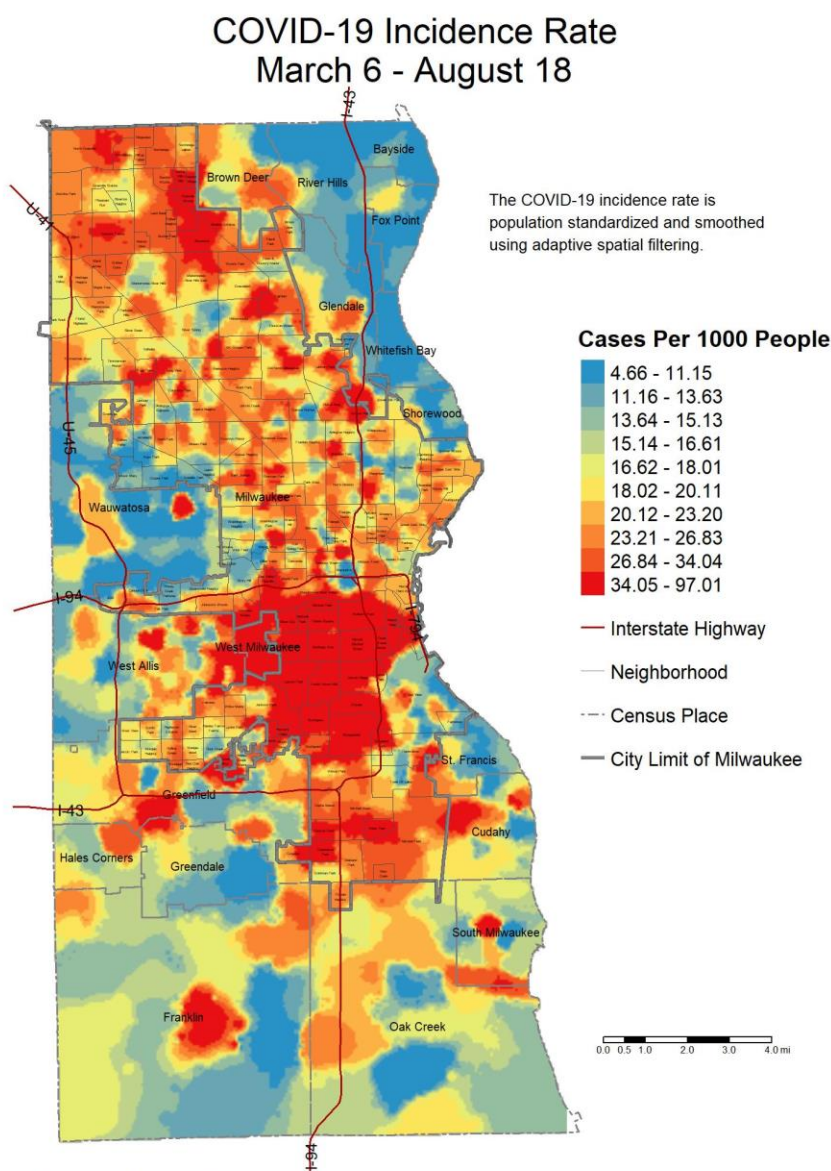


Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)
Created by the Milwaukee County COVID-19 Epidemiology Intel Team

Spatial Patterns of Cases and Testing

COVID-19 spread is spatially patterned. **Map 1** below illustrates the cumulative burden (all confirmed cases) of COVID-19 in Milwaukee County. **Map 2** shows cases confirmed over the last week. **Map 3** shows the overall testing rate across the population. **Map 4** shows the testing rate over the last week. **Map 5** depicts the percentage of tests that were confirmed positive. **Map 6** shows cumulative COVID-19 related hospitalizations. **Map 7** shows the percentage of cases who have been hospitalized. All are crude rate maps created using census block group level COVID-19 data from WEDSS and population data from the US Census. The maps are smoothed to protect confidentiality and ensure that rates are stable while still providing geographic detail. High rates are depicted in red with lower rates depicted in blue. Of note, some of the higher rates observed can be attributed to infections that have spread within group quarters, such as a nursing home, prison, or long-term care facility. Note we have changed the shading conventions from previous reports to use decile cut-offs to provide more contrast in each map.

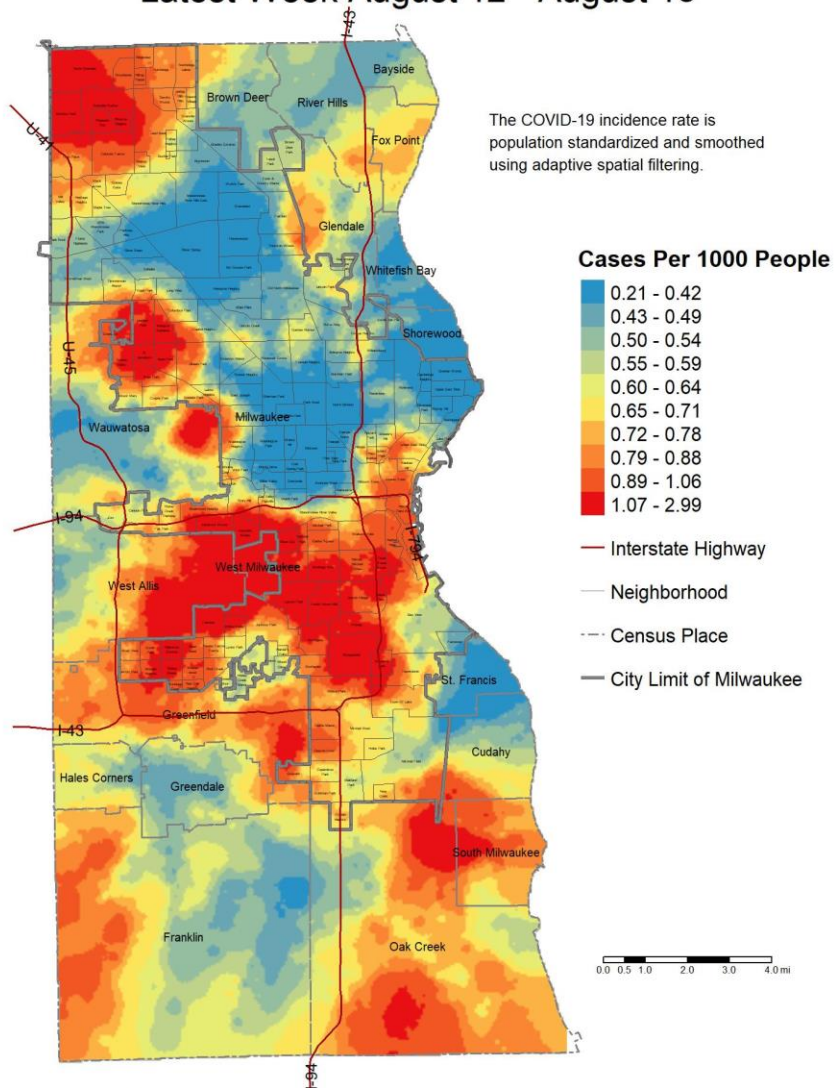
Decile Map 1: All confirmed cases of COVID-19



Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 confirmed cases included.
Data Sources: Wisconsin Electronic Disease Surveillance System (WEDSS) (incidence data)
2018 American Community Survey (population data)
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)
Census Bureau TIGER/Line Shapefiles (census place boundaries)
Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Decile Map 2: Confirmed cases of COVID-19 within the last week

COVID-19 Incidence Rate Latest Week August 12 - August 18



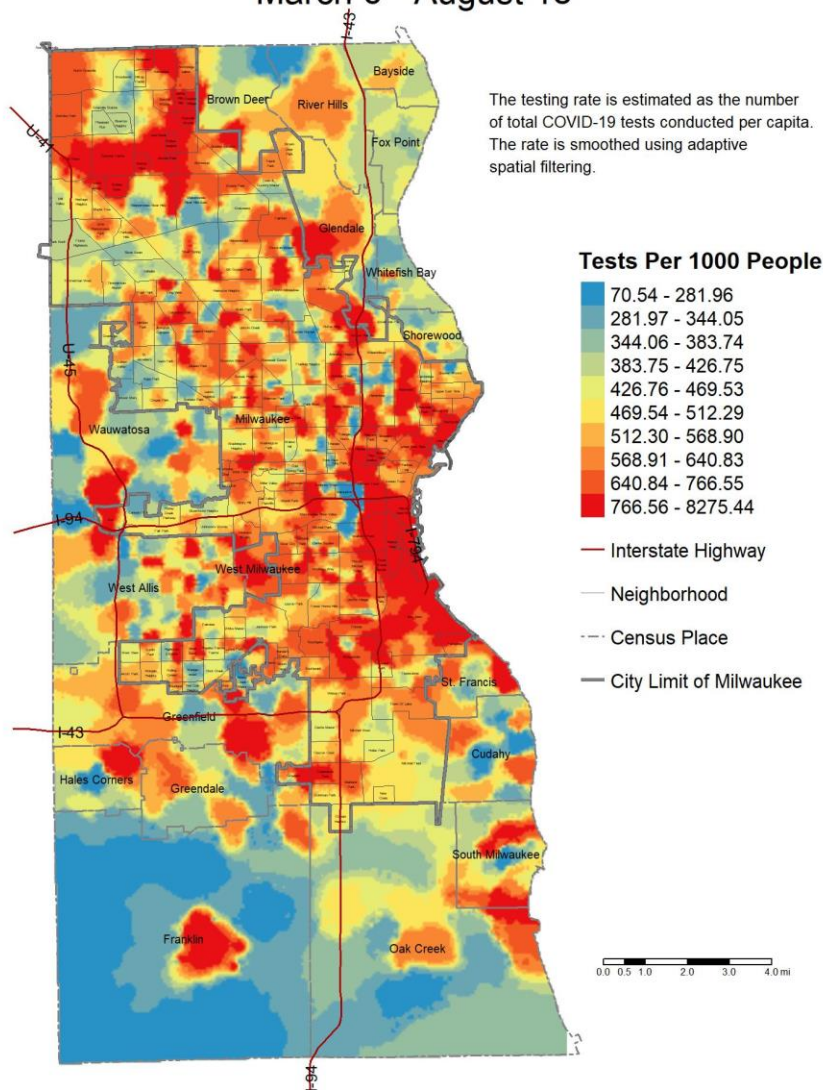
Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 confirmed cases included.

Data Sources: Wisconsin Electronic Disease Surveillance System (WEDSS) (incidence data)
2018 American Community Survey (population data)
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)
Census Bureau TIGER/Line Shapefiles (census place boundaries)

Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Decile Map 3: Overall testing rate

COVID-19 Testing Rate March 6 - August 18



Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 tests included.

Data Sources: Wisconsin Electronic Disease Surveillance System (WEDSS) (incidence data)

2018 American Community Survey (population data)

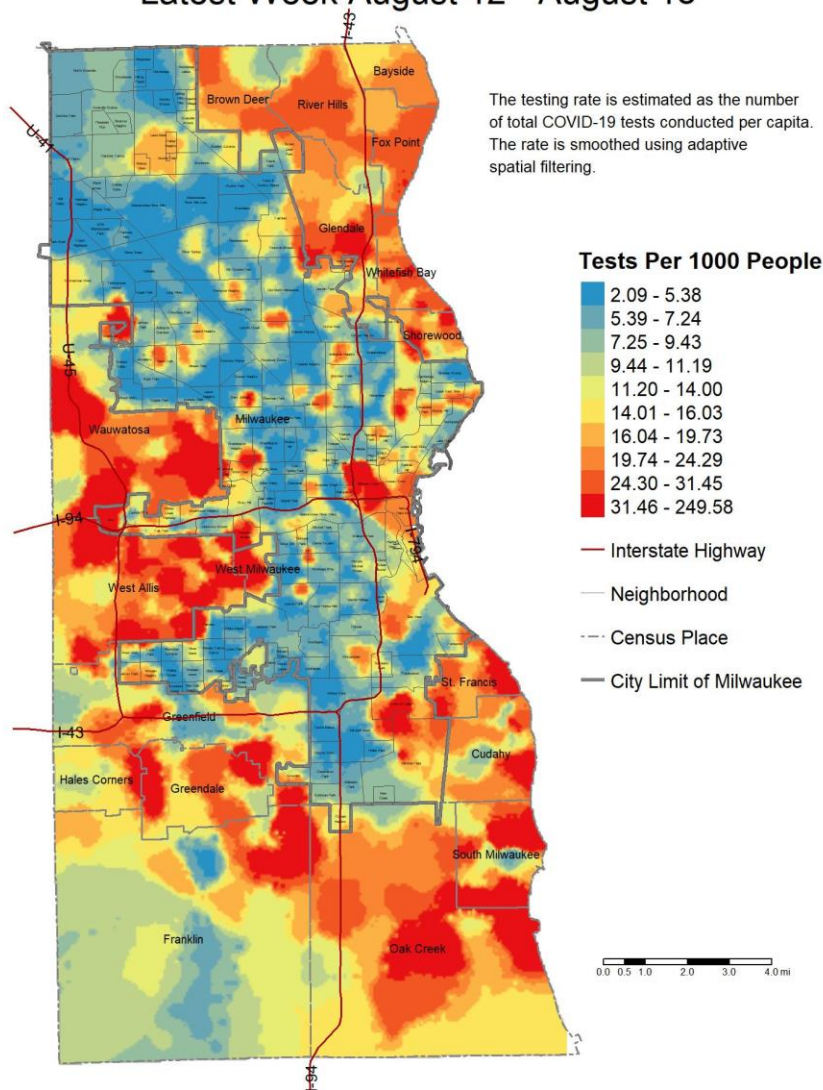
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)

Census Bureau TIGER/Line Shapefiles (census place boundaries)

Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Decile Map 4: Testing rate within the last week

COVID-19 Testing Rate Latest Week August 12 - August 18



Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 tests included.

Data Sources: Wisconsin Electronic Disease Surveillance System (WEDSS) (incidence data)

2018 American Community Survey (population data)

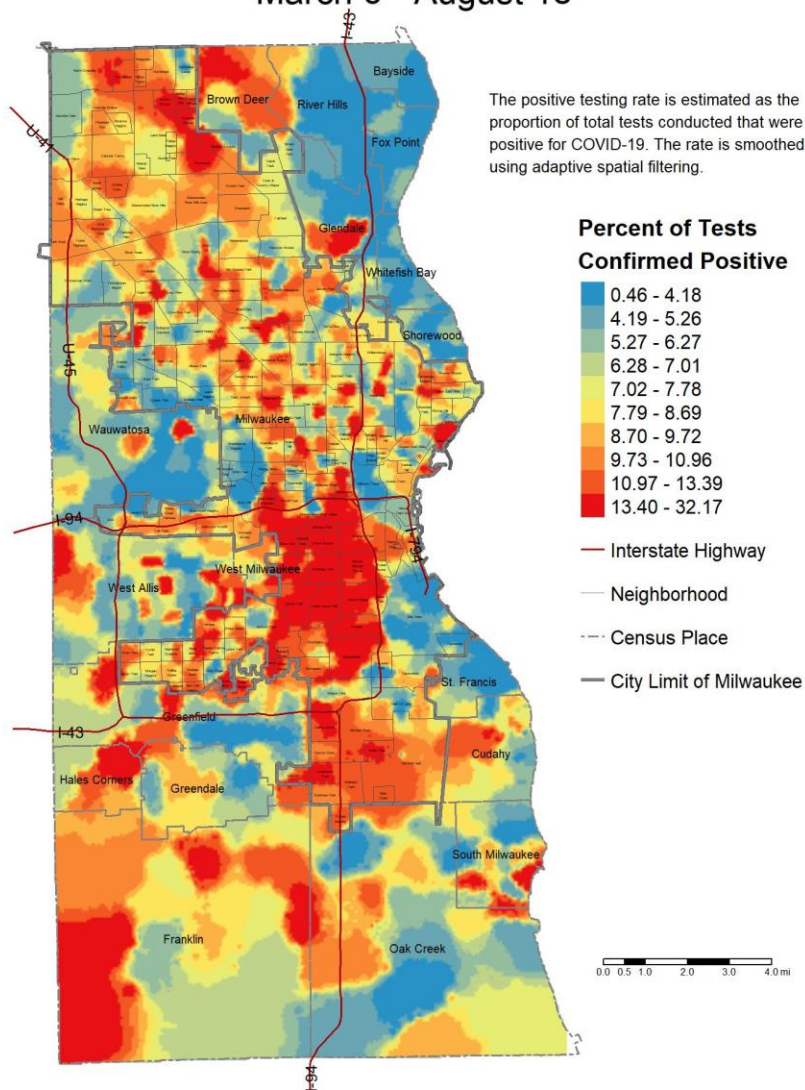
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)

Census Bureau TIGER/Line Shapefiles (census place boundaries)

Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Decile Map 5: Percentage of tests that were confirmed positive

COVID-19 Positive Testing Rate March 6 - August 18



Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 positive tests included.

Data Sources: Wisconsin Electronic Disease Surveillance System (WEDSS) (incidence data)

2018 American Community Survey (population data)

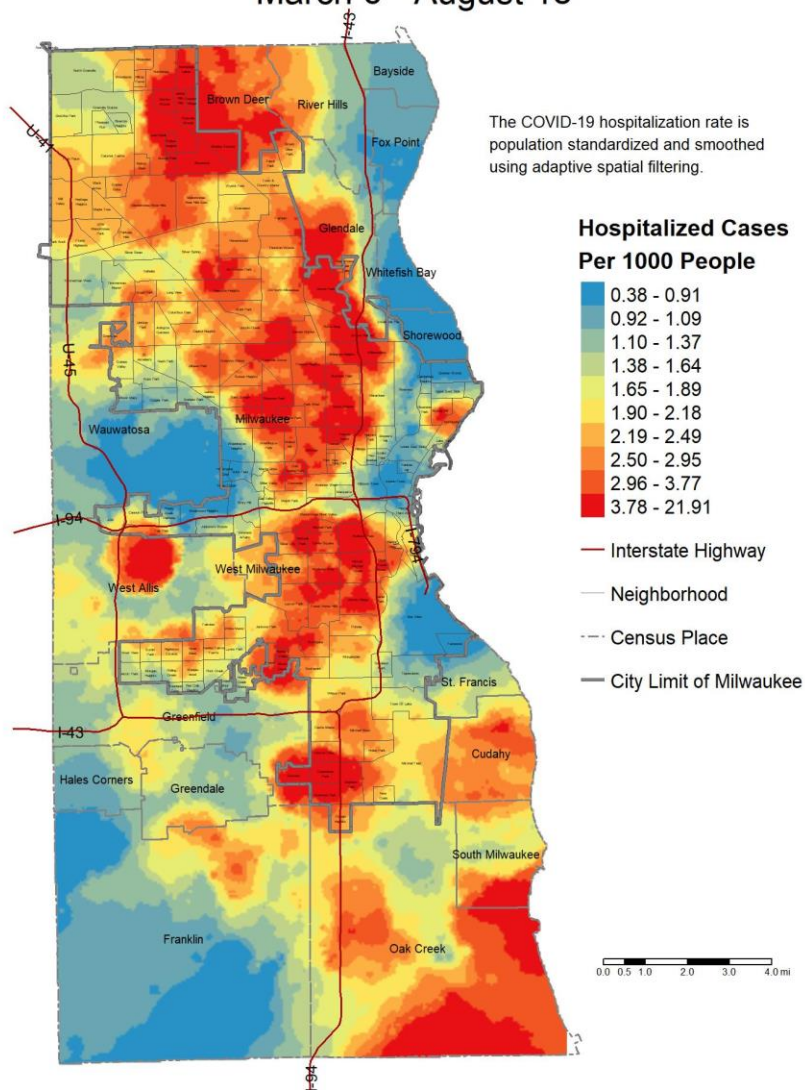
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)

Census Bureau TIGER/Line Shapefiles (census place boundaries)

Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Decile Map 6: COVID-19 related hospitalizations

COVID-19 Hospitalization Rate March 6 - August 18



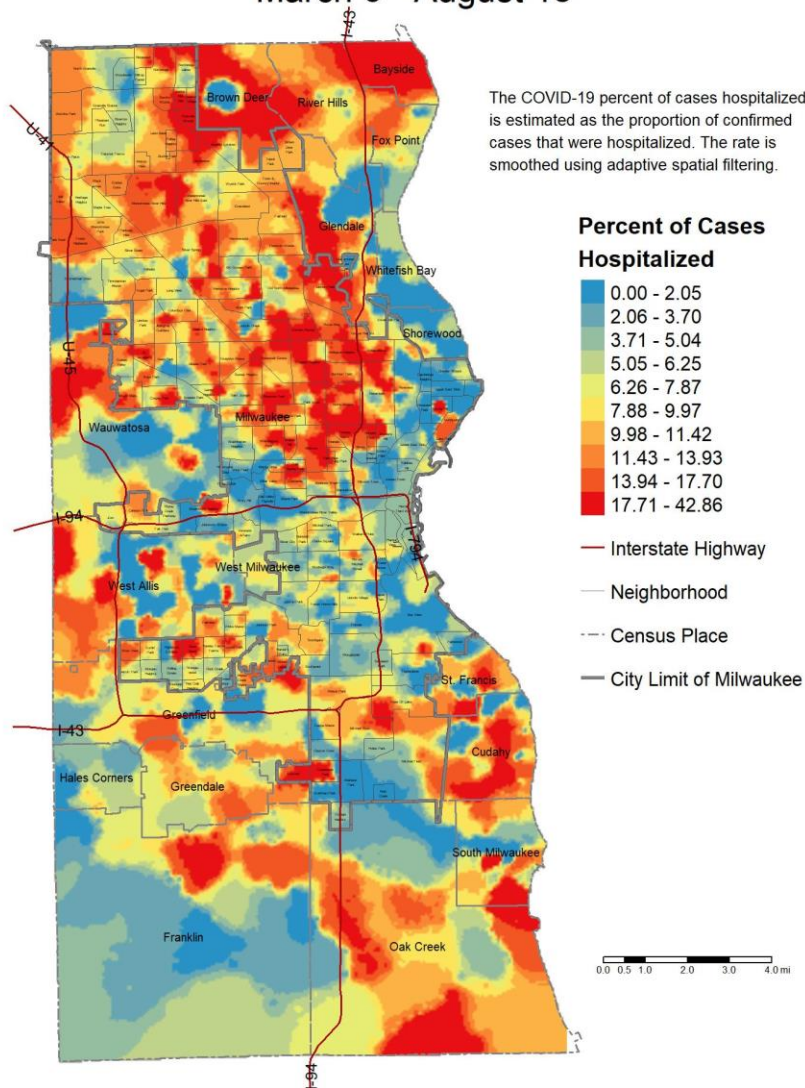
Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 hospitalized cases included.

Data Sources: Wisconsin Electronic Disease Surveillance System (WEDSS) (incidence data)
2018 American Community Survey (population data)
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)
Census Bureau TIGER/Line Shapefiles (census place boundaries)

Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Decile Map 7: Percentage of COVID-19 cases that were hospitalized

COVID-19 Percent of Cases Hospitalized March 6 - August 18



Method: A grid of points is used to estimate rates continuously across the map, based on the nearest cases with a minimum of 15 confirmed cases included.

Data Sources: Wisconsin Electronic Disease Surveillance System (WEDSS) (incidence data)
2018 American Community Survey (population data)
City of Milwaukee Map Milwaukee Portal (neighborhood boundaries)
Census Bureau TIGER/Line Shapefiles (census place boundaries)

Created by the Milwaukee County Covid-19 Epidemiology Intel Team

Data Sources & Acknowledgments

This report was created by faculty and staff in the Medical College of Wisconsin (MCW) Institute for Health and Equity (IHE) in partnership with representatives from local health departments and faculty from the University of Wisconsin-Milwaukee Zilber School of Public Health. Data sources include the Wisconsin Electronic Disease Surveillance System (WEDSS), the US Census Bureau, the Milwaukee County Medical Examiner's office, the Emergency Medicine Resource, and publicly available data obtained from local health and emergency response agencies. Data from the Wisconsin Electronic Data Surveillance System (WEDSS) summarized for the week includes data from August 12, 2020 through August 18, 2020. This work was funded by the Advancing a Healthier Wisconsin Endowment at the Medical College of Wisconsin.

Contact Information

For additional questions on this report, please contact Darren Rausch, Health Officer/Director, Greenfield Health Department, and Lead, Milwaukee County COVID-19 Epidemiology Intel Team:
Darren.Rausch@greenfieldwi.us or (414) 329-5275.